

What is claimed is:

1 1. A semiconductor chip having circuitry, the semiconductor chip comprising:
 2 a metal bond pad over the circuitry and insulated on at least two sides by
 3 passivation material;
 4 a diffusion barrier layer over the metal bond pad; and
 5 a metal layer over the circuitry, the metal bond pad, the diffusion barrier layer,
 6 and at least partially over the passivation material, the metal layer being configured and
 7 arranged for connecting to a wire bond and the diffusion barrier layer being constructed
 8 and arranged to mitigate inter-metallic compounds forming as a reaction to the metal
 9 layer connecting to the wire bond.

1 2. The semiconductor chip of claim 1, wherein the diffusion barrier layer includes
 2 TiN.

1 3. The semiconductor chip of claim 2, wherein the diffusion barrier layer has a
 2 thickness that is at least 0.5 micron.

1 4. The semiconductor chip of claim 2, wherein the diffusion barrier layer has a
 2 thickness that is at least 1.0 micron.

1 5. The semiconductor chip of claim 1, wherein the semiconductor chip is
 2 configured and arranged as a flip chip.

1 6. The semiconductor chip of claim 1, wherein the metal bond pad includes
2 aluminum.

1 7. The semiconductor chip of claim 6, wherein the diffusion barrier layer includes
2 TiN.

1 8. The semiconductor chip of claim 7, wherein the diffusion barrier layer is further
2 constructed and arranged to mitigate inter-metallic Al/Au compounds forming as a
3 reaction to the metal layer connecting to the wire bond.

1 9. The semiconductor chip of claim 8, wherein the diffusion barrier layer has a
2 thickness that is at least 0.5 micron, and the metal layer has a thickness that is at least 3
3 microns.

1 10. The semiconductor chip of claim 1, wherein the metal bond pad and the metal
2 layer include the same type of metal.

1 11. A semiconductor chip having circuitry, the semiconductor chip comprising:
2 an aluminum bond pad over the circuitry and insulated on at least two sides by
3 passivation material;
4 a diffusion barrier layer, including TiN, over the aluminum bond pad; and
5 a metal layer over the circuitry, the metal bond pad, the diffusion barrier layer,
6 and at least partially over the passivation material, the metal layer being configured and

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7 arranged for connecting to a wire bond and the diffusion barrier layer being constructed
 8 and arranged to mitigate inter-metallic aluminum-based compounds forming as a
 9 reaction to the metal layer connecting to the wire bond.

1 12. The semiconductor chip of claim 8, wherein the diffusion barrier layer has a
 2 thickness that is at least 0.5 micron, the metal layer has a thickness that is at least 3
 3 microns.

1 13. The semiconductor chip of claim 12, wherein the diffusion barrier layer is
 2 further constructed and arranged to mitigate inter-metallic Al/Au compounds forming as
 3 a reaction to the metal layer connecting to the wire bond.

1 14. A semiconductor chip having circuitry, the semiconductor chip comprising:
 2 an aluminum bond pad over the circuitry and insulated on at least two sides by
 3 means for electrically insulating the aluminum bond pad;
 4 barrier means, including TiN, over the aluminum bond pad; and
 5 a metal layer over the circuitry, the metal bond pad, the barrier means, and at
 6 least partially over the means for electrically insulating the aluminum bond pad, the
 7 metal layer being configured and arranged for connecting to a wire bond and the barrier
 8 means for mitigating inter-metallic aluminum-based compounds forming as a reaction
 9 to the metal layer connecting to the wire bond.